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ABSTRACT

A study compared the communication skills, general knowledge competence, and professional knowledge competence of beginning regular and industry-prepared vocational teachers in Ohio as measured by the Core Battery tests of the National Teacher Examination. Subjects for the study included 15 beginning vocational agriculture teachers prepared via the regular teacher education method and 51 beginning vocational education teachers in the Central and Southwest Ohio Vocational Education Personnel Development Center Regions prepared via the industry teacher route. Some of the findings were as follows: (1) younger teachers tended to score higher in communication skills competence than older teachers; (2) female teachers had significantly higher communication skills competence and professional knowledge competence than male teachers; (3) teachers with postsecondary degrees had significantly higher communication skills competence, general knowledge competence, and professional knowledge competence than teachers with high school diplomas as their highest educational degrees; and (4) teachers employed by local high schools scored significantly higher in general knowledge competence than those teachers who taught in career centers or correctional facilities. (10 references) (CML)

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Summary of
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Performance of Regular and Industry-Prepared Vocational Education Teachers in Ohio on the National Teacher Exam Core Battery Tests

David L. Doerfert and R. Kirby Barrick

In Ohio, vocational education teacher candidates enter teaching by two different methods of teacher preparation. One method of vocational teacher preparation is the four-year college teacher education program culminating in a Bachelor of Science degree and a provisional teaching certificate (regular teachers). This regular type of teacher education program includes course work in general education, technical subject matter, and professional knowledge (pedagogy).

The other method of vocational teacher preparation in Ohio is called the industry-teacher program. These candidates are individuals who are deemed to be competent in the subject matter to be taught based on the length of service in the occupation. These teachers may also have a bachelor's degree; however, the degree is not in vocational education. After securing a teaching position, these teachers receive temporary certification and must complete three years of inservice coursework and supervision before being granted a provisional teaching certificate. This three-year program of coursework and supervision, added to occupational competence from experience, is considered by the Division of Teacher Education and Certification to be equivalent to the regular four-year college-level teacher education program in Ohio.

Ohio has begun implementation of the Teacher Education and Certification Standard (State Board of Education, 1985), effective July 1, 1987, which requires teacher candidates to complete a teacher competency examination prior to certification. Limited evidence is available regarding the current level of competence of vocational teachers in Ohio. Knowledge of teacher performance on competency tests would allow teacher educators as well as state education personnel to determine types of inservice education that may be required for vocational education teacher candidates who may obtain a low score on the teacher competency examination, prior to the implementation of the State Teacher Competency Exam. This study addressed this question by comparing the communication skills, general knowledge, and professional knowledge competence of the two groups of teachers.

Related Literature

In recent years, traditional methods of teacher certification have been seen as inadequate by the American public. National polls have repeatedly shown that the great majority of the American public sup-

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ports mandatory teacher competency testing for certification purposes. For example, the 1986 Gallup Poll of the public's attitude toward the public schools showed that 85% of the public favored requiring experienced teachers to pass a statesmanship test of basic competence in their subject areas. Three previous education polls showed across-the-board support for teacher competency testing (Gallup & Clark, 1987). In commenting on the wave of the teacher competency testing movement, Isler (1985, p. 27) observed that "competency testing of prospective teachers seems to be taking the country by storm. It is being viewed both as a quality assurance measure for the general public and as a way of demonstrating that teaching is indeed a profession since other professsions already require successful completion of an examination prior to entry."

Testing teachers is now the law in 44 states. By the end of 1990, virtually every state will require tests of basic skills, subject matter knowledge, and/or professional knowledge before a teacher can receive a standard license to teach (Darling-Hammond, 1986). But how important to the learning environment is a knowledgeable teacher?

Moore (1984, p. 18) found that knowledge of the subject is usually the first qualification brought up when people discuss the requirement for great teachers, with the rationale being "one cannot teach what one does not know." Shulman (1986) stated that the ultimate test of understanding rests on the ability to transform one's knowledge into teaching. Citron (1985) believed that the first step to excellence in teaching is to improve the qualifications of those who enter the profession.

A recent study (Cooper, Benz & Thompson, 1988) stated that 28 states are currently utilizing the National Teacher Exam (NTE) for certification purposes. The primary function of the NTE Core Battery is to provide objective evidence of knowledge acquired through teacher-training programs as corroboration of academic preparation for teaching. The NTE Core Battery consists of three separate measures designed to assess Communication Skills, General Knowledge, and Professional Knowledge. Each measure is administered as an independent, two-hour examination. The Communication Skills test evaluates the ability to listen, to read, to write an essay, and to recognize correct, standard-written English. The General Knowledge section covers the areas of mathematics, science, social science, literature and fine arts. The Professional Knowledge section tests instructional planning, implementation, evaluation, professional behavior and understanding of the context of teaching (Rosenfeld, Thornton, & Skurnik, 1986).

The NTE Core Battery is the most common form of testing teacher competence. Few studies existed, however, concerning the competence of vocational education teachers, as measured by the NTE Core Battery tests, on the basis of the method by which they were prepared to teach. This study focused on the comparison of communication skills, general knowledge, and professional knowledge competence of vocational teachers and the type of teacher preparation received by the vocational teacher in Ohio.

Purpose and Objectives

The purpose of the study was to compare the communication skills, general knowledge competence, and professional knowledge competence of beginning regular and industry-prepared vocational teachers in Ohio as measured by the Core Battery tests of the National Teacher Examination (NTE). Four objectives were stated to guide this study:

1. Describe beginning vocational education teachers on the following characteristics: age, gender, high school grade point average, length of industry-related experience, teaching specialty area, type of school currently teaching in, amount of education received, method of teacher preparation received, and scores achieved on the communication skills, general knowledge, and professional knowledge portions of the NTE Core Battery;
2. Compare the beginning vocational education teacher's knowledge competence in communication skills, general knowledge, and professional knowledge with the following characteristics: age, gender, high school grade point average, length of industry-related experience, teaching specialty area, type of school currently teaching in, and amount of education received;
3. Compare regular and industry-prepared beginning vocational education teachers on each of the following characteristics: age, gender, high school grade point average, length of industry-related experience, teaching specialty area, type of school currently teaching in, and amount of education received;
4. Compare regular and industry-prepared beginning vocational education teacher's knowledge competence in communication skills, general knowledge, and professional knowledge.

Procedures

The research was designed to be an ex post facto type of research, utilizing the static-group comparison design. The major independent variable, method of teacher preparation program received which possibly accounted for the variation in communication skills, general knowledge competence and professional knowledge competence, had already occurred. The dependent variable was the adjusted scale scores achieved in the areas of communication skills, general knowledge, and professional knowledge as measured by the 1982-1983 National Teacher Exam Core Battery tests. The independent variables (age, gender, high school grade point average, length of industry-related experience, teaching specialty area, the type of high school currently teaching in, amount of education received, and method of teacher preparation received) were identified via a questionnaire and records available in the Department of Agricultural Education, The Ohio State University. Both instruments were reviewed for content validity by the dissertation committee and a panel of experts.

The target population for this study was all beginning regularly-prepared vocational education teachers in Ohio and all beginning industry-prepared vocational education teachers in Ohio who began teaching during the 1988-89 school year. Due to the inability to identify all members of the target populations and the financial constraints of the study, accessible populations were identified. These accessible populations included all beginning vocational agriculture teachers in Ohio prepared via the regular teacher education method (N=15) and all beginning vocational education teachers in the Central and Southwest Ohio Vocational Education Personnel Development Center Regions prepared via the industry teacher route (N=51). Industry-prepared teachers included teachers employed in correctional facilities. Since the requirements and certification are the same as for public school teachers, the groups were considered to be equal.

The use of these accessible populations raised concerns regarding the external

validity of the study. To overcome these concerns, demographic data were collected from the industry-prepared teachers from the other three regions to determine if they were statistically similar to the teachers of the Central and Southwest Regions. No statistically significant differences were found on any of the demographic characteristics collected. Therefore, the results of the industry-prepared teachers will be generalizable.

Data analysis was performed for three purposes. The first purpose was to describe the teachers on both the independent and dependent variables. The independent variables were described in terms of frequencies, percentages, measures of central tendency and measures of variability. The dependent variables were measured in terms of the converted test scores (total raw score of correct responses on each test was multiplied by a weighting factor as described in Educational Testing Service, 1984 reference) and described in terms of frequencies, percentages, and means.

The second purpose was to compare each independent variable with the dependent variables, communication skills, general knowledge, and professional knowledge competence as measured by the converted test scores. The comparisons were made in terms of frequencies, means, and statistical analysis conducted by means of t-tests and one-way analysis of variance at a predetermined .05 level of significance.

The third purpose was to compare the regularly-prepared vocational teachers with the industry-prepared vocational teachers on both the dependent variables and remaining independent variables. The comparison was made by means of chi-square and t statistics at a predetermined .05 level of significance.

From the accessible populations of regular and industry prepared teachers, 56 teachers (6 regular, 50 industry-prepared) completed the six-hour exam. All data analysis procedures were conducted utilizing the Statistical Package for Social Sciences (SPSSX) which was available at the Instruction and Research Computer Center, The Ohio State University.

Findings

The findings showed that a typical beginning vocational education teacher in this study (n=56) was: 37 years of age, male, had a 3.16 high school grade point average, had 17 years of industry-related experience, taught in trade and industrial education, taught in an area career center, had a high school diploma as the highest educational degree, had received industry teacher preparation, and had about average competence in communication skills, general knowledge and professional knowledge as compared to the national averages reported by the Educational Testing Service (1984).

Communication Skills

The results of the comparison of communication skills competence scores with each of the independent variables showed significant differences in communication skills scores when teachers were grouped by age, gender, high school grade point average, years of industry-related experience, type of school teaching in, and amount of education received. Younger teachers tended to score higher in communication skills competence than older teachers. Female teachers had significantly higher communication skills competence than male teachers. Teachers with higher high school grade point averages achieved higher communication skills competence

scores. Teachers with fewer years of industry-related experience scored higher in communication skills competence than teachers with greater amounts of industry-related experience. Teachers employed in high schools scored had significantly higher communication skills competence than teachers employed by career centers or correctional facilities. Teachers with postsecondary degrees had significantly higher communication skills competence than teachers with high school diplomas as their highest educational degrees. These results are shown in Table 1.

Multiple regression analysis was conducted to determine the proportion of variance in the dependent variable "communication skills competence" which could be explained by the linear combination of the independent variables. The variable "type of school teaching in" was recoded as a dummy variable. The independent variables were entered into the regression model in a stepwise order.

Descriptive data pertaining to the regression analysis are reported in Table 2. An examination of the correlation matrix indicated that the amount of education received (high school diploma vs. postsecondary degree) was the most highly correlated variable (r = .43) with the dependent variable "communication skills competence score." This was followed by age, gender, amount of industry-related experience, method of teacher preparation received, and high school grade point average. The lowest correlated independent variable was whether the teacher taught in an area career center or not (r = -.08).

Amount of education received was selected in the first step of the regression analysis. Age and high school grade point average were selected in the second and third steps respectively. No further steps were conducted since none of the remaining variables were significant at the .05 level to warrant inclusion in the model. As indicated in Table 3, amount of education received, teacher age, and high school grade point average explained a significant proportion of variance in communication skills competence score (R^2 = .3897).

The regression analysis provided information specific to the influence of the independent variables on the dependent variable—communication skills competence. Teachers with an educational degree beyond a high school diploma scored 10 points higher in communication skills competence than their counterparts who have high school diplomas as their highest educational degree (b = 10.31). Teachers scored one-half point lower in communication skills competence for each increased year of age (b = -.519). For each full point increase in high school grade point average, teachers scored 8 points higher in communication skills competence (b = 8.32).

General Knowledge Competence

The results of the comparison of general knowledge competence scores with each of the independent variables showed significant differences in general knowledge scores when teachers were grouped by type of school teaching in and amount of education received. Teachers employed by local high schools scored significantly higher in general knowledge competence than those teachers who taught in career centers or correctional facilities. Teachers with postsecondary degrees scored significantly higher in general knowledge competence than teachers with high school diplomas as their highest educational degrees. These results are shown in Table 4.

Multiple regression analysis was conducted to determine the proportion of variance in the dependent variable "general

Table 1

SUMMARY OF COMPARISONS BETWEEN COMMUNICATION SKILLS COMPETENCE SCORES BY BACKGROUND CHARACTERISTICS

Characteristic	n	Mean Score	Test Statistic	p
Age				
22-33	23	652.65[ab]		
34-45	21	639.71[a]	F = 7.76	.0011**
46 AND OLDER	11	639.75[b]		
Gender				
MALE	45	642.40	t = -2.30	.041*
FEMALE	11	655.73		
High School Grade Point Average				
2.00 - 2.99	9	641.22[ab]		
3.00 - 3.49	19	647.47[a]	F = 3.37	.046*
3.50 - 4.00	10	656.30[b]		
Years of Industry-related Experience				
5-10	14	654.50[ab]		
11-16	17	645.53	F = 4.67	.0059**
17-22	13	637.77[a]		
23 AND LONGER	11	641.27[b]		
Teaching Specialty Area				
AGRICULTURE	12	651.83	t = 1.62	.128
NON-AGRICULTURE	44	643.16		
Type of School Teaching In				
HIGH SCHOOL	8	655.88[ab]		
CAREER CENTER	33	644.03[a]	F = 3.29	.0451*
CORRECTIONAL FACILITY	14	642.50[b]		
Amount of Education Received				
HIGH SCHOOL DIPLOMA	33	640.42	t = -3.31	.002**
POSTSECONDARY DEGREE	22	652.18		

NOTE: Means with like superscripts differ significantly ($p<.05$)

knowledge competence" that was explained by the linear combination of the independent variables. The variable "type of school teaching in" was recoded as a dummy variable. The independent variables were entered into the regression model in a stepwise order.

Descriptive data pertaining to the regression analysis are reported in Table 5. An examination of the correlation matrix indicated that the amount of education received (high school diploma vs. postsecondary degree) was the most highly correlated variable ($r = .49$) with the dependent variable "general knowledge competence score." This was followed by whether the teacher received regular or industry teacher preparation and whether or not the teacher taught in a high school. The

Table 2

SUMMARY DATA: REGRESSION OF COMMUNICATION SKILLS COMPETENCE ON INDEPENDENT VARIABLES (N = 55)

		Intercorrelations										
Variable		X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	Y_1	Mean	S.D.
X_1	Teacher Preparation[a]	1.00	-.35*	.12	.15	-.26*	.66*	.85*	-.41*	.43*	.37*	.109	.315
X_2	Age of Teacher		1.00	-.24*	-.15	.88*	-.13	-.25*	.16	-.04	-.40*	36.76	9.16
X_3	Gender of Teacher[b]			1.00	.32*	-.30*	.18	.18	.06	.33*	.40*	.200	.404
X_4	High School GPA				1.00	-.20	.19	.08	.08	.17	.35*	3.16	.381
X_5	Industry Experience					1.00	-.08	-.29*	.26*	-.02	-.40*	16.95	9.02
X_6	Teaching Specialty[c]						1.00	.53*	-.18	.20	.27*	.218	.417
X_7	Teach High School[d]							1.00	-.49*	.40*	.33*	.145	.356
X_8	Teach Career Center[d]								1.00	-.06	-.08	.582	.498
X_9	Degree Received[e]									1.00	.43*	.400	.494
Y_1	Communication Skills										1.00	645.1	13.4

[a]Industry = 0; Regular = 1.
[b]Male = 0; Female = 1.*
[c]Non-agriculture = 0; Agriculture = 1.
[d]No = 0; Yes = 1.
[e]High School Diploma = 0; Postsecondary = 1.
p < .05

lowest correlated independent variable was whether or not the teacher taught in an area career center (r = -.02).

Amount of education received was selected in the first step of the regression analysis and teacher age was chosen in the second step. No further steps were conducted since none of the remaining variables were significant at the .05 level to warrant inclusion in the model. As indicated in Table 6, amount of education received and teacher age explained a significant proportion of the variance in the general knowledge competence score (R^2 = .2367).

The regression analysis provided information specific to the influence of the independent variables on the dependent

Table 3

REGRESSION OF COMMUNICATION SKILLS COMPETENCE SCORES ON INDEPENDENT VARIABLES SELECTED BY STEPWISE METHOD (N = 55)

Variable	R^2	R^2Change	b	t	p
Amount of Education Received[a]	.1873	.1873	10.31	3.419	.0012
Age	.3367	.1494	-.519	-3.201	.0024
High School Grade Point Average	.3897	.0531	8.318	2.107	.0401
(Constant)			633.78		

*High School Diploma = 0; Postsecondary Degree = 1

Standard error = 10.80
Adjusted R^2 = .3538
For model: F = 10.85; p < .0001

Table 4

SUMMARY OF COMPARISONS BETWEEN GENERAL KNOWLEDGE COMPETENCE SCORES BY BACKGROUND CHARACTERISTICS

Characteristic	n	Mean Score	Test Statistic	p
Age				
22 - 33	23	653.52		
34 - 45	21	644.05	F = 3.09	.0539
46 AND OLDER	11	643.73		
Gender				
MALE	45	646.62	t = -1.14	.275
FEMALE	11	653.55		
High School Grade Point Average				
2.00 - 2.99	9	643.78		
3.00 - 3.49	19	652.79	F = 1.41	.2581
3.50 - 4.00	10	653.40		
Years of Industry-related Experience				
5 - 10	14	653.21		
11 - 16	17	649.59	F = 2.23	.0964
17 - 22	13	639.62		
23 AND LONGER	11	648.55		
Teaching Specialty Area				
AGRICULTURE	12	655.75	t = 1.90	.077
NON-AGRICULTURE	44	645.86		
Type of School Teaching In				
HIGH SCHOOL	8	661.75[ab]		
CAREER CENTER	33	647.73[a]	F = 5.71	.0057**
CORRECTIONAL FACILITY	14	641.86[b]		
Amount of Education Received				
HIGH SCHOOL DIPLOMA	33	642.18	t = -4.00	< .00155**
POSTSECONDARY DEGREE	22	656.59		

NOTE: Means with like superscripts differ significantly (p<.05)

variable "general knowledge competence." Teachers with more than a high school diploma scored 11 points higher in general knowledge competence than teachers who have a high school diploma as their highest educational degree (b = 14.11). As for the variable "teacher age," for each additional year of age, teachers scored over half a point lower in general knowledge competence (b = -.401).

Professional Knowledge Competence

The results of the comparison of professional knowledge competence scores with each of the independent variables showed significant differences in professional knowledge scores when teachers were grouped by gender, type of school teaching in, and amount of education received. Fe-

Table 5

SUMMARY DATA: REGRESSION OF GENERAL KNOWLEDGE COMPETENCE ON INDEPENDENT VARIABLES (N = 55)

Variable		Intercorrelations											
		X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	Y_1	Mean	S.D.
X_1	Teacher Preparation[a]	1.00	-.35*	.12	.15	-.26*	.66*	.85*	-.41*	.43*	.41*	.109	.315
X_2	Age of Teacher		1.00	-.24*	-.15	.88*	-.13	-.25*	.16	-.04	-.27*	36.76	9.16
X_3	Gender of Teacher[b]			1.00	.32*	-.30*	.18	.18	.06	.33*	.19	.200	.404
X_4	High School GPA				1.00	-.20	.19	.08	.08	.17	.22*	3.16	.381
X_5	Industry Experience					1.00	-.08	-.29*	.26*	-.02	-.24*	16.95	9.02
X_6	Teaching Specialty[c]						1.00	.53*	-.18	.20	.28*	.218	.417
X_7	Teach High School[d]							1.00	-.49*	.40*	.39*	.145	.356
X_8	Teach Career Center[d]								1.00	-.06	-.02	.582	.498
X_9	Degree Received[e]									1.00	-.49*	.400	.494
Y_1	General Knowledge										1.00	647.9	14.6

[a]Industry = 0; Regular = 1.
[b]Male = 0; Female = 1.*
[c]Non-agriculture = 0; Agriculture = 1.
[d]No = 0; Yes = 1.
[e]High School Diploma = 0; Postsecondary = 1.
p < .05

male teachers scored significantly higher in professional knowledge than male teachers. Teachers employed in local high schools scored significantly higher in professional knowledge than teachers employed in correctional institutes. Teachers with postsecondary degrees scored significantly higher than teachers with high school diplomas as their highest educational degrees. These results are presented in Table 7.

Multiple regression analysis was conducted to determine the proportion of variance in the dependent variable "professional knowledge competence" that was explained by the linear combination of the independent variables. The variable "type of school teaching in" was recoded as a dummy variable. The independent variables were entered into the regression model in a stepwise order.

Table 6

REGRESSION OF GENERAL KNOWLEDGE COMPETENCE SCORES ON INDEPENDENT VARIABLES SELECTED BY STEPWISE METHOD (N = 55)

Variable	R^2	R^2 Change	b	t	p
Amount of Education Received[a]	.2367	.2367	14.11	4.102	.0001
Age	.2996	.0629	-.401	-2.160	.0354
(Constant)			657.05		

[a]High School Diploma = 0; Postsecondary Degree = 1

Standard error = 12.49
Adjusted R^2 = .2726
For model: F = 11.12; p = .0001

Table 7

SUMMARY OF COMPARISONS BETWEEN PROFESSIONAL KNOWLEDGE COMPETENCE SCORES BY BACKGROUND CHARACTERISTICS

Characteristic	n	Mean Score	Test Statistic	p
Age				
22 - 33	23	651.26		
34 - 45	21	639.62	F = 5.75	.0056
46 AND OLDER	11	639.18		
Gender				
MALE	45	641.16	t = -3.11	.009**
FEMALE	11	656.82		
High School Grade Point Average				
2.00 - 2.99	9	644.00		
3.00 - 3.49	19	646.47	F = 1.78	.1844
3.50 - 4.00	10	654.50		
Years of Industry-related Experience				
5 - 10	14	649.57		
11 - 16	17	646.76	F = 2.19	.1011
17 - 22	13	637.23		
23 AND LONGER	11	642.64		
Teaching Specialty Area				
AGRICULTURE	12	649.83	t = 1.23	.240
NON-AGRICULTURE	44	642.70		
Type of School Teaching In				
HIGH SCHOOL	8	655.38[a]		
CAREER CENTER	33	645.03	F = 5.78	.0054**
CORRECTIONAL FACILITY	14	636.36[a]		
Amount of Education Received				
HIGH SCHOOL DIPLOMA	33	639.09	t = -3.96	< .001**
POSTSECONDARY DEGREE	22	652.36		

NOTE: Means with like superscripts differ significantly (p<.05)

Descriptive data pertaining to the regression analysis are reported in Table 8. An examination of the correlation matrix indicated that the amount of education received (high school diploma vs. postsecondary degree) was the most highly correlated variable (r = .48) with the dependent variable "professional knowledge competence score." This was followed by gender and method of teacher preparation received. The lowest correlated independent variable was whether or not the teacher taught in an area career center (r = .08).

Amount of education received was selected in the first step of the regression analysis with age and gender chosen in the second and third steps respectively. No further steps were conducted since none of the remaining variables were significant at

Table 8

SUMMARY DATA: REGRESSION OF PROFESSIONAL KNOWLEDGE COMPETENCE ON INDEPENDENT VARIABLES (N = 55)

Variable		Intercorrelations										Mean	S.D.
		X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	Y_1		
X_1	Teacher Preparation[a]	1.00	-.35*	.12	.15	-.26*	.66*	.85*	-.41*	.43*	.37*	.109	.315
X_2	Age of Teacher		1.00	-.24*	-.15	.88*	-.13	-.25*	.16	-.04	-.34*	36.76	9.16
X_3	Gender of Teacher[b]			1.00	.32*	-.30*	.18	.18	.06	.33*	.45*	.200	.404
X_4	High School GPA				1.00	-.20	.19	.08	.08	.17	.29*	3.16	.381
X_5	Industry Experience					1.00	-.08	-.29*	.26*	-.02	-.30*	16.95	9.02
X_6	Teaching Specialty[c]						1.00	.53*	-.18	.20	.21	.218	.417
X_7	Teach High School[d]							1.00	-.49*	.40*	.33*	.145	.356
X_8	Teach Career Center[d]								1.00	-.06	-.08	.582	.498
X_9	Degree Received[e]									1.00	-.48*	.400	.494
Y_1	Professional Knowledge										1.00	644.4	13.8

[a]Industry = 0; Regular = 1.
[b]Male = 0; Female = 1.
[c]Non-agriculture = 0; Agriculture = 1.
[d]No = 0; Yes = 1.
[e]High School Diploma = 0; Postsecondary = 1.
* $p < .05$

the .05 level to warrant inclusion in the model. As indicated in Table 9, amount of education received, teacher age, and gender explained a significant proportion of the variance in the professional knowledge competence score ($R^2 = .3871$).

The regression analysis provided information specific to the influence of the independent variables on the dependent variable "professional knowledge competence." Teachers with educational degrees beyond the high school diploma scored 10 points higher in "professional knowledge competence" than their counterparts who had high school diplomas as their highest educational degree (b = 10.49). Teachers scored four-tenths of a point lower for each

Table 9

REGRESSION OF PROFESSIONAL KNOWLEDGE COMPETENCE SCORES ON INDEPENDENT VARIABLES SELECTED BY STEPWISE METHOD (N = 55)

Variable	R^2	R^2 Change	b	t	p
Amount of Education Received[a]	.2260	.2260	10.49	3.229	.0022
Age	.3274	.1014	-.389	-2.290	.0262
Gender[b]	.3871	.0597	9.13	2.230	.0302
(Constant)			652.71		

[a]High School Diploma = 0; Postsecondary Degree = 1
[b]Male = 0; Female = 1

Standard error = 11.12
Adjusted $R^2 = .3516$
For model: $F = 10.74$; $p < .0001$

increased year of age (b = -.389). Female vocational education teachers scored 9 points higher in professional knowledge competence than their male counterparts (b = 9.13).

Teacher Preparation and Demographic Characteristics

The analysis of the results of the comparison of the method of teacher preparation received with the other independent variables identified significant relationships between the former and age, teaching specialty area, type of school teaching in, and amount of education received. Beginning regular teachers were significantly younger than beginning industry-prepared teachers. Industry teachers tended to be teachers in trade and industrial education. Regular teachers tended to teach in local high schools as opposed to industry teachers who tended to teach in area career centers. Industry teachers tended to have high school diplomas as their highest educational degree, whereas regular teachers have earned their bachelor's degrees. These results are presented in Table 10.

Teacher Preparation and NTE Scores

The results of the comparison of the method of teacher preparation received with the dependent variables showed that regular teachers scored significantly higher in communication skills, general knowledge, and professional knowledge competence than industry-prepared teachers. These results are presented in Table 11.

Conclusions

The following conclusions are derived from the research findings.

1. The vocational education teacher's age, gender, high school grade point average, years of industry-related experience, type of school teaching in, and amount of education received are significantly correlated with the teacher's communication skills competence scores.
2. The type of school a vocational education teacher is teaching in and the amount of education received are significantly correlated with the teacher's general knowledge competence scores.
3. The vocational education teacher's age, gender, type of high school teaching in, and amount of education received are significantly correlated with the teacher's professional knowledge competence scores.
4. A teacher's age, teaching specialty area, type of school teaching in, and amount of education received are related to the method of teacher preparation chosen.
5. Regularly-prepared vocational education teachers scored significantly higher in communication skills, general knowledge, and professional knowledge competence than industry-prepared teachers.

Recommendations

1. School superintendents, state supervisors, and teacher educators should recruit teachers who possess more than a high school education since these teachers will demonstrate higher knowledge competence as measured by the NTE exams.
2. Inservice programming designed to improve the communication skills, general knowledge, and professional knowledge competence should be made available for beginning vocational education teachers.

Table 10

SUMMARY OF COMPARISONS BETWEEN METHOD OF TEACHER PREPARATION RECEIVED BY BACKGROUND CHARACTERISTICS

Variable	Regular (n = 6)	Industry (n = 50)	Test Statistic	p
Age				
MEAN	27.67	37.88	t = -2.96	.023*
Gender				
MALE	4	41	Chi-square = 0.12	.7267
FEMALE	2	9		
High School Grade Point Average				
MEAN	3.318	3.143	t = 2.12	.051
Years of Industry-related Experience				
MEAN	10.33	17.76	t = -1.95	.056
Teaching Specialty Area				
AGRICULTURE	6	6	Chi square = 19.69	< .0001**
NON-AGRICULTURE	0	44		
Type of School Teaching In				
HIGH SCHOOL	6	2		
CAREER CENTER	0	34	Chi square = 39.57	.0001**
CORRECTIONAL FACILITY	0	14		
Amount of Education Received				
HIGH SCHOOL DIPLOMA	0	33	Chi square = 7.49	.0062**
POSTSECONDARY DEGREE	6	16		

Table 11

SUMMARY OF COMPARISONS BETWEEN COMMUNICATION SKILLS, GENERAL KNOWLEDGE AND PROFESSIONAL KNOWLEDGE COMPETENCE SCORES BY METHOD OF TEACHER PREPARATION RECEIVED

Competence Area	Regular (n = 6)	Industry (n = 50)	Test Statistic	p
Communication Skills				
MEAN	659.17	643.32	t = 3.26	.015 *
General Knowledge				
MEAN	664.83	645.96	t = 5.62	<.001 **
Professional Knowledge				
MEAN	659.00	642.46	t = 3.35	.013 *

3. As states continue to examine and/or adopt reform measures in teacher education, the study of knowledge competence of regular and industry-prepared vocational education teachers should be continued.
4. Industry-prepared teachers should be retested at the completion of their preparation program to determine if their knowledge competence is similar to regularly-prepared teachers at the completion of the bachelor's degree program.
5. A high level of association was found among the communication skills, general knowledge, and professional knowledge scale scores. Further research should be conducted to discriminate among teachers on the basis of one of these three tests.
6. Research should be conducted with the groups of vocational education teachers in this study to determine the relationship between the teacher's knowledge competence scores and their effectiveness as a teacher.

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SUMMARY OF RESEARCH SERIES

In Ohio, vocational education teacher candidates enter teaching by two different methods of teacher preparation. One method of vocational teacher preparation is the four-year college teacher preparation program culminating in a Bachelor of Science Degree and a provisional teacher certificate. The other method of vocational teacher preparation is called the industry-teacher program. These candidates are individuals who are deemed to be competent in the subject matter to be taught based on the length of service in the occupation. After securing a teaching position, these teachers receive temporary certification and must complete three years of inservice course work and supervision before being granted a provisional teaching certificate.

Ohio has begun to implement the Teacher Education and Certification Standard, which requires teacher candidates to complete a teacher competency examination prior to certification. Limited information is available regarding the level of competence of vocational teachers in Ohio. This study addresses this question by comparing the communication skills, general knowledge, and professional knowledge competence of the two groups of teachers. The findings will help teacher educators and state education personnel determine types of inservice education that may be required for vocational education teacher candidates who obtain a low score on the teacher competency examination.

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Research has been an important function of the Department of Agricultural Education since it was established in 1917. Research conducted by the Department has generally been in the form of graduate theses, staff studies, and funded research. It is the purpose of this series to make useful knowledge from such research available to practitioners in the profession. Individuals desiring additional information on this topic should examine the references cited.

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